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# DAMAGE BY THE RICE WATER WEEVIL PROVED NEGLIGIBLE

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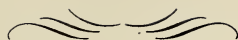
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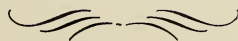
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(1) Special acknowledgment is made to J. Mitchell Jenkins, Superintendent of the Rice Experiment Station, Crowley, La., for valuable cooperation and assistance. Acknowledgment is also made to C. E. Chambliss, in charge of Rice Investigations, Bureau of Plant Industry, and to T. E. Holloway, in charge of Sugar Cane and Rice Insect Investigations, Bureau of Entomology, for their interest and suggestions.





It will be noticed that this work was done by two employees of the United States Department of Agriculture, at the Rice Experiment Station, Crowley, La. All of the work done at this Station is cooperative, the United States Department of Agriculture bears a part of the expense and the Louisiana Experiment Station a part.





## DAMAGE BY THE RICE WATER WEEVIL PROVED NEGLIBIBLE

The rice water weevil (2) is present in practically all rice fields in the South. The larva of this weevil feeds upon the roots of the rice plant and the adult feeds upon the leaves. As soon as the rice is flooded, the female weevil lays eggs in the roots of the rice plant, from which the larva, or "root maggot," develops. There are at least two generations a year. The water weevil goes through its life cycle on a number of grasses growing in water as well as upon rice. Drainage of the flooded fields to control the weevil has been the practice when the rice looked sickly or yellow. The work of drainage is troublesome and expensive, however, as it involves the cutting of the levees and their subsequent reclosing, and causes a considerable waste of water in reflooding. The planter who pumps from his own well is put to extra labor and expense, while the canal companies that furnish water to other planters must spend more money for pumping. In dry years in Louisiana, when much of the fresh water is pumped from the streams, salt water may sooner enter from the Gulf, and thus an excessive percentage of salt may be present in the irrigation water, which is injurious to the rice.

Great trouble and expense would be justified in the control of a serious pest, but as far back as 1922 there was a suspicion in the minds of a few rice planters that the water weevil could not be so classed. After eleven years of observation, Mr. J. Mitchell Jenkins, Superintendent of the Rice Experiment Station, Crowley, La., concluded that the damage caused by the "root maggot" is very small.

Observations made in 1923 showed that the so-called "root maggot" injury was often caused by soil conditions, deep water, grass, and other things unfavorable to rice culture.

It was therefore decided that before further control work was done on the rice water weevil, experiments should be made to determine the amount of injury caused by its feeding. Accordingly in the spring of 1924 a screened cage was constructed, 17 feet wide, 39 feet long, and 6 feet in height above the rice levee. This cage, as

(2) *Lissorhoptrus simplex* Say.

well as the later ones, was covered with 18-mesh screen wire which was known to prevent the entrance or escape of water weevils. There was a screen-wire partition in the center, dividing the cage into two equal parts. In the spring of 1926 three additional cages were constructed. These were 18 feet wide, 40 feet long, and 6 feet in height above the rice levee. Except in size, they were exact replicas of the first cage.

The land on which the cages were placed was typical rice land. It was prepared and the rice planted in drill rows 8 inches apart, as is the most common local field practice. The Fortuna variety of rice was used in 1924 and 1925, and the Blue Rose in the years following. A margin was allowed on all sides of the cages. The actual planted area in each side within the first cage was 16 by 14 feet, or 224 square feet. The area planted in each side within the last three cages was 18 by 16 feet, or 288 square feet. The irrigation water was run into the cages through pipes having their openings covered with fine screen to prevent the entrance of water weevils. Just before or immediately after flooding, all weevils which could be found were collected from both sides of the cages. Weevils were then released in one side of each of the cages, while the other side was kept free from them. The side in which weevils were released was alternated each year. The number released annually was 450 in the first cage and 612 in each of the other cages. These numbers were selected as representing the largest number of water weevils found in the rice under actual field conditions. (1) The weevils for the cages were caught from rice fields prior to flooding, or at the time of flooding.

Plant heights were recorded about three weeks after flooding and at intervals thereafter. The height of 10 plants growing in each side of each house was taken. Throughout the season an attempt was made to approximate as nearly as possible the actual field conditions in the cages. The water in them was drained prior to harvesting and the rice cut and shocked inside the cages. Later, the rice was threshed and the grain and straw produced in each side of each cage were weighed.

(1) In determining the number of weevils to release, counts were made in flooded rice fields by means of a screen frame 2 by 2 by 2 feet. The frame was set down in a rice field and counts made of the weevils inside. About ten minutes was taken for each count to allow weevils beneath the surface to come to the surface. A count was made in five places in each field and the result of the five counts averaged. The largest number of weevils found in a rice field was 8 per 4 square feet.



The weight of the grain produced in the cages was as follows:

Cage No.	1924		1926		1927		1928		1929	
	Inf.	Un-Inf.	Inf.	Un-Inf.	Inf.	Un-Inf.	Inf.	Un-Inf.	Inf.	Un-Inf.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1	10.37	9.62	4.87	3.87						
2			13.50	11.50	10.13	8.75	7.40	7.50	10.50	11.5
3			7.00	8.37	14.25	13.25	5.10	6.20	13.75	11.0
4			6.75	7.75			8.10	7.80	7.00	7.5

The total weight of the grain produced in the infested sides of all cages was 118.72 pounds, while the total weight in the uninfested sides was 114.61 pounds. From these figures it appears that the insect has no appreciable effect on the yield of grain.

The weight of the straw produced in the cages was as follows:

Cage No.	1924		1925		1927		1928		1929	
	Inf.	Un-Inf.	Inf.	Un-Inf.	Inf.	Un-Inf.	Inf.	Un-Inf.	Inf.	Un-Inf.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1	32.0	33.8	13.6	13.8						
2					18.2	18.0	13.6	14.8	15.0	15.75
3					31.2	28.2	26.8	27.2	21.5	24.00
4							19.2	17.2	15.0	16.25

The total weight of the straw in the infested side of the cages was 206.1 pounds, while the total weight of that from the uninfested sides was 209 pounds. Thus it is evident that the weevil has little effect on the straw. It might be mentioned here that a heavy yield of straw is not desired by the rice planters.

In 1926, heavy rains followed threshing and the straw began to rot before it was dry enough to be weighed; therefore, no weights for the straw were obtained. In 1925, rats destroyed a part of the grain in the shock on the uninfested side, consequently when weighed it was



several pounds less than in the infested side and these figures were not placed in the grainweight tables.

To determine whether lighter grains resulted from the feeding of the root maggot, 5 lots of 100 grains each from each side of the cages were husked and weighed. The average weight for 100 grains from the infested side was 2.146 grams, and for 100 grains from the uninfested side, 2.150 grams. Two other lots of 500 grains each were weighed and gave, infested side, 10.67 grams, and uninfested, 10.68 grams. It thus appears that the presence of the water weevil does not cause lighter grains.

It was found that the rice plants in the infested side were generally smaller in height when examined three or four weeks after flooding.

During the years while the screen-cage experiment was running, field observations were made to supplement the experimental data. It was found that, as a general rule, all rice takes on a sickly, yellowish color about three weeks or a month after flooding. This color is evidently due to the fact that the rice plant sheds one set of roots and puts out a new set. At this time the rice is said by the planters to be suffering from "root-maggot" injury. Sometimes the rice leaves develop a reddish tinge and many die. Fields have been examined in which all but the top leaves were dead. Upon examination, it was usually found that few rice water weevils were present, while a larger number were present in the roots of healthy plants nearby. Many times this condition was found to be due to the fact that the water was so deep that only the top-most leaves were above the surface. In other cases it was apparent that soil conditions were the cause of the poor appearance of the rice. In some fields, grass was so thick that the rice had a stunted, sickly appearance.

The cage experiments do not indicate that the water weevil produces an appreciable effect on the yield of grain or straw. From the results of the cage experiments and also from extensive observations, it may be stated that the loss to the rice crop from "root-maggot" injury is negligible, and that drainage undertaken for the purpose of killing "rootmaggots" is never worth while. Drainage may, however, be necessary and worth while in order to cure other ills heretofore said to have been caused by the "root-maggot."